UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,820	10/24/2003	Chester Ledlie Sandberg	5659-20900/EBM	1426

7590 05/28/2009

DEL CHRISTENSEN
SHELL OIL COMPANY
P.O. BOX 2463
HOUSTON, TX 77252-2463

EXAMINER	
PAIK, SANG YEOP	
ART UNIT	PAPER NUMBER
3742	
MAIL DATE	DELIVERY MODE
05/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/693,820
Filing Date: October 24, 2003
Appellant(s): SANDBERG ET AL.

Eric B. Meyertons
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 3/9/09 appealing from the Office action mailed 8/18/08.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

U.S. Pat. Appli. No. 10/693,816

U.S. Pat. Appli. No. 10/693,700

U.S. Pat. Appli. No. 10/693,840

U.S. Pat. Appli. No. 11/112,881

(3) Status of Claims

The statement of the status of claims contained in the brief is correct (please note that claim 1711 has a wrong status identifier, it should have been "(previously amended)" instead of "(currently amended)").

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 4,716,960	Eastlund et al	01-1988
US 5,065,818	Van Egmond	11-1991
US 4,382,469	Bell et al	05-1983
EP 0 130 671	Rose	01-1985
CA 2,151,521	Bridges et al	06-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1691-1696, 1699-1716 and 1719-1734 and 1736-1753 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund et al (US 4,716,960) in view of Van Egmond (US 5,065,818) or Bell et al (US 4,382,469), and Rose (EP 0130671).

Eastlund shows the system claimed including a heater well extending into a hydrocarbon formation, a heating element located in the heater well and transfer heat from the heating element to hydrocarbons such the paraffin deposited in the heater well, and an AC supply with a voltage above about 200 volts. Eastlund further shows the heating element having a copper inner core with a steel outer conductor, but it does not explicitly disclose an overburden formation and that the steel outer conductor is ferromagnetic.

Van Egmond or Bell shows that it is well known in the art that a heater well is provided through an overburden formation and into zones for heating or carbonizing the hydrocarbon containing zones. Bell further shows that it is also well known in the art to employ the in-situ process.

Rose shows a heating element having an inner core made of copper with an outer conductor made of a ferromagnetic carbon steel which allows the heating element to be self-regulating. Rose further discloses that its heating element is configured such that the heater automatically reduces its heat output near or above a selected temperature including the Curie temperature of about 760 °C.

In view of Van Egmond or Bell, and Rose, it would have been obvious to one of ordinary skill in the art to adapt Eastlund with the heater well that extends through an overburden formation and into the hydrocarbon containing formation at least about 10 m or more to effectively heat such hydrocarbon containing layer and provide the heating element as shown in Rose to provide a self-regulating heating element to more conveniently maintain a desired heating temperature. And in view of Bell, it would also have been obvious to one of ordinary skill in the art to employ the in-situ process for processing the hydrocarbons as alternative and additional means for heating.

Regarding claim 1711, the limitation that the selected temperature is "within about 50 °C of the Curie temperature of the ferromagnetic material" fully reads on Rose since the selected temperature disclosed in EP130671 (i.e., the Curie temperature) falls within the claimed range.

Regarding claims 1699 and 1719, Rose discloses a number of different iron-nickel alloys with varying Curie temperatures suitable as ferromagnetic materials for autoregulating electric heaters. See P. 14, Table I (noting that iron-nickel alloys have relatively lower Curie temperatures compared to other ferromagnetic materials).

Regarding claim 1700 and 1742, see P. 9, lines 24-26 of Rose.

Regarding claim 1702 and 1722, see P. 6, lines 24-28 of Rose.

Regarding claim 1744, because (1) the heater of Rose utilizes the skin effect of the conductor to ultimately dictate its heating, (2) the inverse relationship between frequency and skin depth is well known (see P. 2, lines 11-28), and (3) a wide frequency range of 50 Hz - 10 KHZ is envisioned (see P. 8, line 19-23), the heater of Rose would inherently control the skin depth in the conductor by varying the applied frequency.

Regarding the recited values of the amps or current, the reduced heat above or near the selected temperature and the turndown ratio, since no criticality is seen in these specific values and since such specific values claim optimized result-effective variables, it would have been obvious to one of ordinary skill in the art to include such values in operating the heating system as being well within the scope of routine experimentation by skilled artisans depending on the desired temperature and heat output. It is well settled that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233,235 (CCPA 1955).

Claims 1698 and 1718 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund in view of Van Egmond, Bell, and Rose as applied to claims 1691-1696, 1699-1716 and 1719-1734 and 1736-1753 above, and further in view of Bridges et al (CA 2,151,521).

Eastlund in view of Van Egmond, Bell, and Rose shows the system claimed except for a three-phase power source. But powering a downhole ferromagnetic electric heater with a three-phase power source is well known in the art as evidenced, for example, by Bridges noting Figs. 11 and 12 and P. 32, line 11 - P. 35, line 21. As is well known in the art, three phase loads take advantage of the higher voltage and power level associated with three-phase power distribution.

In view of Bridges, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a three-phase power source in the previously described system to take advantage of the higher voltage and power Level associated with three-phase power distribution.

Claims 1691-1696, 1698-1716, 1718-1735, 1736-1753 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the claims of copending Application No. 10/693,700 or the claims of Application No. 10/693,840.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending claims include the recited system including a heater well, an AC supply, one or more electrical conductors comprising a

ferromagnetic material in the heater well for heating the hydrocarbon formation except for the AC supply providing a voltage above about 200 volts. But since the voltage is proportionally related to the desired heating output, it would have been obvious to provide the voltage at the recited volts or any other volts to achieve a corresponding heating output, i.e., higher the output higher, the voltage desired.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

(10) Response to Argument

With respect to Eastlund, the appellant argues that Eastlund only teaches the heating of fluids such as hydrocarbons that have already been mobilized through the perforations (12, 113) in the well tubing and does not show heating of the hydrocarbons before they enter into the well tubing. The appellant also argues a fluid layer that contains hydrocarbon as shown in Eastlund is not the same as the recited hydrocarbon containing layer formation, i.e., the appellant's specification states that the underground formations have different layers in them and that some of these layers do not contain hydrocarbon. This argument is not deemed persuasive since Eastlund clearly shows a heater provided in a heater well tubing wherein the heater well tubing extends into a layer formation wherein the fluid is admitted through the perforations (12, 113), and Eastlund clearly teaches for heating of the hydrocarbons in the well tubing. As stated in the ground of rejection, while Eastlund does not explicitly recite an overburden layer, but it is noted that the Van Egmond and Bell references are alternatively applied to show a

well known overburden formation through which a heater well tubing extends into a layer that contains the hydrocarbon.

The appellant argues that Eastlund only teaches the heating of fluids such as hydrocarbons that have already been mobilized through the perforations (12, 113) in the well tubing and not heating and mobilizing the hydrocarbons before they enter the well tubing, but this argument is not deemed persuasive in view of the combined teaching of Easlund in view of Van Egmond and Bell which clearly show a heater well tubing that extends into the hydrocarbon containing layer through an overburden layer wherein the hydrocarbons are heated and thus mobilized. The appellant argues that Eastlund shows no portion of the heaters is even proximate to a hydrocarbon containing layer, but it is noted that Van Egmond further shows a heater cable (9, 10) that extends into the hydrocarbon containing layer formation as well as Bell which shows a conductive element 23 provided in the carbonaceous material layer where heat is provided throught the conductive element 23. The appellant argues that since Eastlund teaches of providing more heat in the upper level of the well, no heat is needed or provided in the lower portion of the well tubing as illustrated in Figures 1 and 7A wherein the bottom of the heater is shown to be distantly separated from the perforations 12 in view of the "long break lines" in Figures 1 and 7A. This argument is not deemed persuasive since it is noted that the drawing figures are for illustrated purposes, and the sizes and dimensions of the drawing figures are not in scale.

Contrary to the appellant's argument, Eastlund does not show or teach that no heat is needed in the lower portion of the well. For example, Figure 5A in Eastlund

illustrates a sinker (59) that is provided in close proximate to the perforations 56 where hydrocarbons are admitted there into, and based on this showing, a sinker (115) in Figure 7A could be provided proximate to the perforations 113 wherein the heater (106) which is connected to the sinker (115) would be positioned proximate to the perforations thereto where there is a hydrocarbon containing layer formation. The appellant also argues that there is no motivation to combine with Eastlund and Van Egmond since Van Egmond appears to destroy the intent and purposes of Eastlund. The appellant argues Eastlund is shown to provide heating in the upper portions with no heating in the hydrocarbon containing layer whereas Van Egmond is shown to provide a significant heating in the hydrocarbon containing layer formation as shown as the zone 2 in Figure 1. This argument is not deemed persuasive since Eastlund also teaches for providing a heat at different selected depths of the well. Such disclosure does not support the appellant's statement that no heating is provided in the lower portion including in the hydrocarbon containing layer.

With respect to Bell, the appellant argues that Bell shows applying a DC to an anode and a cathode of the conductive elements (23, 41) and that Bell does not show a resistive heating of the heater. It is noted that Bell is applied show a well known well tubing that extends through an overburden into a hydrocarbon containing layer formation wherein Bell further shows mobilizing hydrocarbons including the in situ production of the gas wherein a heat is produced in the formations via the electrical current (column 1, lines 56-60).

With respect to Rose, the appellant argues Bell teaches away the invention of Rose since Bell shows the use of DC power supply rather than an AC supply. It is noted Eastlund shows an AC power wherein Bell is applied to shows a well known a well bore tubing that is shown to extend through an overburden. The appellant further argues there is no motivation to combine Rose and Eastlund since Rose only teaches heating fluids inside of a device and that Rose does not show or teach transferring heat to a hydrocarbon containing layer. It is noted, however, that Rose is applied to teach a known electrical heating element having the ferromagnetic sections and its advantageous use in the heating cable (106) of Eastlund (also see Figures 7-10). As stated in the ground of rejection, while Eastlund shows an outer conductor made of steel, it does not call such steel conductor as a ferromagnetic, but Rose shows an outer conductor comprising steel as a ferromagnetic material. Furthermore, Rose shows a known electrical heater having an inner conductor with an outer ferromagnetic conductor and its operating schemes including the auto-regulating heating temperatures. To one of ordinary skill in the art, it would have been obvious to modify the heater of Eastlund having an auto-regulating heater as shown in Rose since they are in the same field of endeavor which is in the field of utilizing an electrical heater and for heating a fluid or liquid involving an extensively long distance. The appellant argues that modifying the Eastlund device to operate at or near the Curie temperatures described by Rose would teach away the Eastlund device, but this argument is not deemed persuasive since Rose is applied to show the use of ferromagnetic conductor in use with a conductor, including a low resistance copper, as done in the appellant's

invention, and the controlling of the temperatures would have been obvious as a routine experimentation to achieve a desired temperature. The appellant argues that if the Eastlund device were to operate at the Curie temperature as taught by Rose, an electrical current would flow the entirety of the heater with a significant current along the outer wall of the well tubing which would be contrary to the desired maximum current flow primarily along the inner wall of the tubing in Eastlund. This argument is not deemed persuasive since the appellant's argument is based on the embodiment shown in Figure 5 of Eastlund while the teaching of Rose is applied to modify the heater (106) of Eastlund as shown in the embodiment illustrated in Figure 12 where the system does not require providing current to the well tubing (see column 12, lines 37-47). Thus, the appellant's arguments are not deemed persuasive.

All claims are deemed taught and obvious by the applied prior art, including the Bridges reference, as stated in the ground of the rejections.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/SANG Y PAIK/

Primary Examiner, Art Unit 3742

Conferees:

/TU B HOANG/

Supervisory Patent Examiner, Art Unit 3742

/Henry Yuen/

Special Programs Examiner, TC 3700